USDA-SCS
Alabama

All Field Offices
Technical Guide
Section IV
April 1981 (Revised)

ENGINEERING STANDARD

FOR

552-A - IRRIGATION PIT OR REGULATING RESERVOIR (NO.)
(Irrigation Pit)

Definition

A small storage reservoir constructed to regulate or store the supply of water available to the irrigator.

Scope

This standard includes open pits excavated below the ground surface to intercept and store either surface water or unconfined groundwater for irrigation. It applies to pits if part of the water is impounded above natural ground, provided that the depth of water above the ground surface, as measured at the spillway crest elevation, does not exceed 3 feet. It does not apply to excavated pits designed primarily for the control or regulation of flow where storage is not a major feature.

The standard establishes the minimum acceptable quality level for the planning and functional design of irrigation pits. It does not include detailed design criteria or construction specifications for individual pits or components of the storage facility.

Purpose

To collect and store water until it can be used beneficially to satisfy crop irrigation requirements.

Conditions Where Practice Applies

This practice applies only to sites meeting all of the following criteria and conditions:

1. The existing water supply available to the irrigated area is insufficient to meet conservation irrigation requirements during part or all of the irrigation season.

2. The construction of an irrigation pit is the most practical means of developing the needed additional supply of water.

3. An adequate supply of good quality water is available for storage from surface runoff, streamflow, or from a subsurface source.

4. Topographic, geologic, water table, and soils conditions at the site are satisfactory for the feasible development of the irrigation pit.

5. Where surface runoff enters the pit, the contributing drainage area is or can be protected against erosion to the extent that normal sedimentation will not materially shorten the planned life of the pit.

6. The contemplated excavation of the pit and storage of water are permitted by applicable State statutes and regulations.

Design Criteria

Capacity Requirements

Irrigation pits shall be designed to have a usable capacity sufficient to satisfy irrigation requirements in the design area throughout the growing season of the crop or crops being irrigated. In computing capacity requirements, due consideration shall be given where applicable to groundwater inflow, surface runoff, precipitation, evaporation and seepage. Additional capacity shall be provided as necessary for sediment storage. The usable capacity of a pit that depends wholly on groundwater as a source of supply shall be that portion of the pit that is below the static water level.

Pit Design

Irrigation pits shall be designed according to the criteria of excavated ponds in the standard for Ponds (378).

Side Slopes

Side slopes of irrigation pits shall be no steeper than those required to maintain slope stability in the type of material encountered.

Inlet Protection

Where surface runoff enters the pit through a natural or excavated channel, the side slope of the pit shall be protected against erosion by the use of a suitable structure.

Embankment and Spillway Requirements

Where irrigation pits supplied by surface runoff are located on sloping terrain, and a portion of their capacity is impounded against an embankment, the embankment shall be designed to comply with the Soil Conservation Service Engineering Standard for Pond (Code 378) and a suitable spillway shall be provided to pass excess storm runoff either around, through, or under the embankment. The capacity of the spillway shall be no less than that required to accommodate the peak rate of runoff that can be expected to be equalled or exceeded once in 10 years or for the class of structure in Standard 378.

Placement of Waste Material

Waste material excavated from the pit shall be placed or disposed of in such a manner that its weight will not endanger the stability of the pit side slopes and where it will not be washed back into the pit as a result of rainfall. To accomplish these objectives, the waste material may be placed in one of the following ways:

1. Uniformly spread to a height not exceeding 3 feet with the top surface graded to a continuous slope away from the pit. In such cases, no berm is required.

2. Uniformly stack to a depth of 3 feet with side slopes assuming the natural angle of repose for the excavated material behind a berm equal in width to the maximum depth of the pit but not less than 12 feet.

3. Haul from the site.

Outlet Works

Suitable outlet works shall be provided for the controlled release of irrigation water. The capacity of the outlet works shall be no less than that required to provide the outflow rate needed to meet peak period irrigation system demands.

Vegetation

Vegetation shall be established on all exposed areas of the excavated pit or regulating reservoir, spillway borrow areas, and spoil areas. Where drainage area around the pit or reservoir is not protected by sod or other permanent vegetation, a vegetative strip of not less than 30 feet in width shall be provided around the pond. Vegetative treatment shall be applied in accordance with the Field Office Technical Guide for critical area planting.

References: National Engineering Field Manual for Conservation Practices
Ponds and Reservoirs
National Engineering Handbooks.

CONSTRUCTION SPECIFICATION

FOR

552-A - IRRIGATION PIT

Scope

All designs and plans will be in keeping with the standard for irrigation pits and will describe the requirements for proper installation of the practice to achieve its intended purpose.

This item shall consist of the clearing and excavation required for the construction of the irrigation pit, and the disposal of all cleared and excavated material. The construction operations shall be carried out in such a manner that erosion, air, water, and noise pollution will be minimized and held within legal limits as established by state regulations.

Clearing

All trees, brush, and stumps shall be cut as flush with the ground as is practical and removed from the site and spoil areas before excavation is performed. All material cleared from the area shall be disposed of by burning or removing from the site and stacking. All burning shall conform to Alabama laws and regulations.

Excavation

The completed pond excavation, berms, and placed banks (spoil disposal) of waste material shall conform as nearly to lines, dimensions, grades, and slopes shown on the plans or staked on the site as skillful operation of the excavating equipment will permit.

Vegetation

Vegetative treatment shall be established as specified or as shown on the plans. Vegetation shall be applied as critical area planting and will include seedbed preparation, seeding, liming, fertilizing and mulching. When specified, the fill slopes, spillway, spoil area, or ramp shall be fenced to provide protection to the pond and vegetation.